

REMARKS

The Office Action of September 27, 2004 objected to the title of the specification as "not descriptive" and required a new title "... that is clearly indicative of the invention to which the claims are directed". On the preceding page, Applicant has amended the title to insert "WITH SHUTTER FUNCTION" to indicate the function performed by the circuit and method that is defined by the claims. If the amended title is still unacceptable to the Examiner, Applicant respectfully requests that the Examiner suggest a title that the Examiner deems appropriate for the claimed invention.

The Office Action also rejected each of the pending claims 1-6 under 35 U.S.C. §102(a) as being anticipated by Afghahi, U.S. 6,046,444 (hereinafter "Afghahi"). "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed.Cir. 1987), MPEP § 2131. Applicant respectfully submits that "each and every element" of the product claims and each and every step of the method claims pending in this application are not disclosed by the cited Afghahi reference. Although the Office Action meticulously sets forth or paraphrases each of Applicant's claims in subparagraph form, followed by a parenthetical identification of the Figure, element and/or portion of the specification of Afghahi that allegedly discloses that element or functional statement, several of those portions of Afghahi that are parenthetically identified simply do not disclose the claimed element or function whereby the claims are not met by Afghahi. For example, in the Office Action on

page 2, last two lines, (a) Applicant's claimed "capacitor" is equated to Afghahi's capacitor C2 but Afghahi's capacitor C2 does not perform the claimed function of "accumulating a terminal voltage of the photo-detecting element as a pixel signal" and (b) the Office Action referenced to Afghahi column 4, lines 11-14 does not disclose Applicant's claimed function. There is no reference in those four lines of accumulating a voltage "as a pixel signal". Similarly, the Office Action on page 3, lines 6-14, asserts that the various steps performed by the transistors and capacitor are disclosed in Afghahi at column 4, lines 4-21, which is simply inaccurate and does not support the rejection. As set forth below, the Applicant's claimed circuit and method is entirely different than that which is disclosed in Afghahi, even though some of the same elements are used although in a different arrangement.

The Rejection of Claims 1 and 5 as Anticipated by Afghahi

The photo-sensor circuit according to the present invention is provided with a second MOS transistor Q2 for transferring a parasitic capacitance electric charge from the capacitor C1 to the capacitor C2. On the other hand, the device disclosed by the Afghahi reference applied in the rejection has a second transistor (FET M21) which, however, does not transfer a parasitic capacitance electric charge from the Afghahi parasitic capacitance (CD2) of the photo-sensing element (PD20) to the capacitor (C2). The second transistor (FET M21) uses the electric charge of the parasitic capacitance (CD2) for switching ON and OFF an amplifier B24 (by driving a gate of the transistor), which is an entirely different function.

The device of the present invention functions in the following unique manner; (1) before accumulating a pixel signal, (2) both the first MOS transistor Q1 and the second transistor Q2 are turned ON, (3) terminal voltages of the photo-detecting element PD and the capacitor C1 are equalized, and (4) the second MOS transistor Q2 is turned OFF to bring the capacitance into the open state. The pixel signal described in item (1) is supported by the description in Applicant's specification "a capacitor (C2) for accumulating a terminal voltage of the photo-detecting element as a pixel signal" (p. 13, lines 13-15). Namely, the pixel signal represents an accumulated capacitance of the capacitor.

To the contrary, the Afghahi reference discloses that the system functions in the following manner; (1) before accumulating an image signal C2 at node B', (2) the first transistor is turned ON (to generate a reset signal) and the second MOS transistor is turned ON (with a voltage A' higher than the threshold value), (3) the terminal voltage of the photo-detecting element and the terminal voltage of the capacitor are not equalized (see Fig. 3: TIME 0-1 and 5-6), and (4) the second MOS transistor is turned ON to bring the capacitor into open state (see Fig. 3: TIME 2-5 and TIME 6 and thereafter). Thus, Afghahi does not disclose any technical concept and method of equalizing the terminal voltages (A' and B') of the photo-detecting element and the capacitor as described by the present invention and required by claims 1 and 5.

It is noted that the above-described constitution of the photo-sensor circuit according to the present invention can realize the high reproducibility of the pixel signal. It is suggested by the Examiner that Afghahi describes, in Col. 4, lines 14-21, the above-

described technical feature of the present invention. However, this description states merely the fact that the second transistor (FET M21) is turned OFF by decreasing the voltage (potential) A'. Thus, Afghahi never teaches or suggests this technical feature of the present invention and therefore does not anticipate Applicant's claims 1 and 5.

The Rejection of Claims 2 and 6 as Anticipated by Afghahi

Like the case of claims 1 and 5 set forth above, the photo-sensor circuit and method claimed in claims 2 and 6 according to the present invention is provided with a second MOS transistor for transferring a parasitic capacitance electric charge from the capacitor C1 to the capacitor C2. On the contrary, Afghahi describes a second transistor (FET M21) that does not transfer an electric charge of parasitic capacitance (CD2) of a photo-detecting element (PD20) to a capacitor (C2). This transistor (FET M21) uses the electric charge of CD2 for switching an amplifier (driving the gate thereof), which is different from the present invention.

The photo-sensor circuit according to the present invention performs as follows; (1) before accumulation of a pixel signals (C2 at node B'), (2) switching the second MOS transistor and, at the same time, (3) setting a voltage of the initial setting means to a low level, (4) bringing a parasitic capacitance of the photo-detecting element and a terminal voltage of the capacitor into a low level state, and (5) switching the voltage of the initial setting means to a high level state to start accumulation of a pixel signal.

On the contrary, the device of Afghahi performs as follows: (1) before accumulation of a pixel signal (Fig. 3; TIME 0-2 and TIME 5-6); (2) turning ON the second MOS transistor

M21 and, at the same time (Fig. 3: TIME 0-1 and TIME 5-6); (3) setting a voltage of the initial setting means to a high level state (Fig. 3: TIME 0-1 and TIME 5-6); (4) switching the parasitic capacitance (A') to a high level state and a terminal voltage of the capacitor to a low level state, and (5) switching a voltage of the initial setting means to a low level state to start the accumulation of a pixel signal. This is a substantial difference in the arrangement of the elements and their functions of Afghahi from the present invention. Thus, clearly claims 2 and 6 are not anticipated.

The Rejection of Claim 3 as Anticipated by Afghahi

Claim 3 depends from Claims 1 and 2 and it is submitted that Claim 3 is allowable for the same reasons that Claims 1 and 2 are allowable, as set forth above.

The Rejection of Claim 4 as Anticipated by Afghahi

Claim 4 is a product claim directed to photo-sensor circuit similar to Claim 2 but includes additional limitations and therefore it is respectfully submitted that Claim 4 is allowable for the same reasons as Claim 2.

SUMMARY

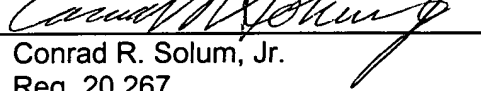
In summary, it is believed that the amended title overcomes the Office Action objection to the original title but, if not, the Examiner is urged to suggest a further amendment to the title that will be acceptable. All of the original claims 1-6 were rejected as anticipated by Afghahi but, as the foregoing explanations clearly establish, Afghahi does not disclose each

and every element of the product claimed nor each and every step of the method claims whereby the rejections do not meet the legal standard for "anticipation". Reconsideration of the claim rejections and a favorable action on the merits is respectfully requested.

Respectfully submitted,

Fulbright & Jaworski L.L.P.

Dated: 12/23/04

By: 
Conrad R. Solum, Jr.
Reg. 20,267

Customer No.

000167

PATENT TRADEMARK OFFICE

Fulbright & Jaworski L.L.P.
Twenty Ninth 29th Floor
865 South Figueroa Street
Los Angeles, CA 90017-2576
Telephone: (213) 892-9200